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This exam is worth 1 CEU in **Nutrient Management**. An exam score of 70% or higher will earn CEU credit. The International CCA program has approved self-study CEUs for 20 of the 40 CEUs required in the two-year cycle.

DIRECTIONS

1. Read the self-study article on pages 38-40 carefully.
2. Answer the questions by clearly marking an "X" in the box next to the best answer for each question.
3. Complete the self-study exam registration form on the back of this page.
4. Clip out this self-study examination page, fold and place in envelope.
5. Enclose a check for $10.00 made payable to the American Society of Agronomy, for processing fees. Payment in U.S. funds only.
6. **Mail your self-study exam and fee to:** ASA c/o CCA Self-Study Exam, 677 S. Segoe Road, Madison, WI 53711. *Please allow 60 days for processing.*
7. An electronic version of this test is also available at *www.AgProfessional.com*. Go to the Certified Crop Advisers section (lefthand column) and access the "CCA Advantage" link.

Particulate and Dissolved Chemical Separation and Phosphorus Release from Treated Dairy Manure

December Self-Study Examination

11. Typical mechanical separation efficiencies have ranged from:

[ ] a. 5 to 30 percent of particulate removal.
[ ] b. 10 to 35 percent of particulate removal.
[ ] c. 15 to 40 percent of particulate removal.
[ ] d. 20 to 45 percent of particulate removal.

2. The solid-liquid separation process is a function of:

[ ] a. building larger wastewater lagoons.
[ ] b. siphoning the liquid from the solid.
[ ] c. time, allowing the sediment to settle.
[ ] d. coagulation, flocculation, flotation, sedimentation or filtration.

3. Polyacrylamides and polyamines polymers build bridges between particles, thereby:

[ ] a. preventing aggregation.
[ ] b. making it more difficult to remove particulates.
[ ] c. creating larger aggregates that either float or settle out of the liquid phase.
[ ] d. increasing suspended particulates.

4. Co-blending of polymers and P-immobilizing mineral amendments results in:

[ ] a. increased aggregation and reduced rates of individual additives.
[ ] b. increased rates of polymers or P-immobilizing mineral amendments needed.
[ ] c. increased suspended particulates.
[ ] d. decreased manure particle aggregation.

5. It was found that suspensions can re-stabilize as aggregates disintegrate at a metal salt amendment rate of:

[ ] a. 1 g L^{-1}.
[ ] b. 10 g L^{-1}.
[ ] c. 30 g L^{-1}.
[ ] d. 100 g L^{-1}.

6. High rates of additions of hydrolyzing metal salts exceeding 10 g L^{-1} can result in:

[ ] a. destabilized manure suspensions.
[ ] b. increased particle aggregation and reduction in rates of manure additives.
[ ] c. increased manure particle aggregation.
[ ] d. lower suspension pH that induces charge reversal and dispersion of manure particles.

7. Fly ash increases liquid-solid separation by:

[ ] a. forming amorphous hydroxides gels that entrapped particulates.
[ ] b. de-stabilizing the manure suspension.
[ ] c. coalescing particles and causing co-sedimentation.
[ ] d. increasing suspended particulates.

8. Metal salts such as $Al_2(SO_4)_3$, $AlCl_3$, or $FeCl_3$ reduce dissolved P in the liquid phase by:

[ ] a. destabilizing and dispersing manure suspensions.
[ ] b. forming metal amorphous hydroxide gels that sorb and retain manure phosphorus.
[ ] c. lowering solution pH that induces charge neutralization and reversal on manure particulates.
[ ] d. forming aquo-metal ions that surround and complex individual manure particles.

Over

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9. Fly ash reduces dissolved P from the liquid phase when

[ ] a. fly ash particles act as in situ screen.
[ ] b. inter-particle distances are reduced.
[ ] c. manure and ash particles coalesce and co-settle.
[ ] d. phosphate reacts with surface hydroxyl and silanol groups of the ash particles.

10. Release of manure P from soil that received treated manure was:

[ ] a. reduced because DRP immobilized in treated manure remained insoluble.
[ ] b. increased because DRP immobilized in treated manure did not remain insoluble.
[ ] c. insignificant because DRP immobilized in treated manure remained insoluble.
[ ] d. undetermined because DRP immobilized in treated manure remained insoluble.

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SELF-STUDY EXAM REGISTRATION FORM

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Signature of Registrant as it appears on Code of Ethics

I certify that I alone completed this self-study course and recognize that an ethics violation may revoke my CCA status.

This exam issued December 2003 expires December 2006.

SELF-STUDY EXAM EVALUATION FORM

Rating Scale: 1=Poor 5=Excellent

Information presented will be useful in my daily crop advising activities: 1 2 3 4 5

Information was organized and logical: 1 2 3 4 5

Graphics/tables were appropriate and enhanced my learning: 1 2 3 4 5

I was stimulated to think how to use and apply the information presented: 1 2 3 4 5

This article addressed the stated competency area and performance objective(s): 1 2 3 4 5

Briefly explain any "1" ratings: _____

Topics you would like to see addressed in future self-study materials: _____